

## Claims

1. Method for synchronizing a radio communication system divided into radio cells,
  - with which data is transmitted by means of multiple access methods,
  - with which every radio cell has a base station for the radio coverage of a number of mobile stations assigned to the radio cell,characterized in that
  - a base station determines at least one pilot signal and notifies the assigned mobile stations in a downlink,
  - the assigned mobile stations transmit the notified pilot signal to the base station in an uplink,
  - the base station receives pilot signals both from the mobile stations assigned to it as well as pilot signals from mobile stations of adjacent radio cells and uses the received pilot signals to determine a synchronization value for a time synchronization and/or frequency synchronization, to which the base station is synchronized.
2. Method according to claim 1, characterized in that
  - a mobile station receives both the pilot signal from the base station of its own radio cell and pilot signals from base stations from adjacent radio cells and
  - the mobile station uses the received pilot signals to determine a synchronization value for a time synchronization and/or for frequency synchronization, to which the mobile station is synchronized.
3. Method according to claim 1 or 2, characterized in that the pilot signal is selected by the base station in a

- random manner and/or the pilot signal is transmitted by the mobile station of a radio cell in the uplink such that a rise in the pilot signal level takes place within the radio cell.
4. Method according to one of claims 1 to 3, characterized in that a time slot multiples access method and/or a frequency multiple access method is used for data transmission.
  5. Method according to claim 4, characterized in that in the case of the time slot multiple access method with data transmission frame by frame the pilot signal is selected in an alternating manner frame by frame.
  6. Method according to claim 4 or 5, characterized in that in the case of the time slot multiple access method with data transmission frame by frame the pilot signal is transmitted at the end of the frame.
  7. Method according to one of claims 4 to 6, characterized in that the same time slots and/or same frequencies are used for pilot signal transmission.
  8. Method according to one of the preceding claims, characterized in that an OFDM data transmission method is used for data transmission and at least two pilot signal subcarriers are used for pilot signal transmission.
  9. Method according to claim 8, characterized in that when a time slot multiple access method with frame by frame data transmission is used, the pilot signal subcarriers are

selected in an alternating manner frame by frame.

10. Method according to claim 8 or 9, characterized in that when a time slot multiple access method with frame by frame data transmission is used, pilot signal transmission takes place at the end of the frame.
11. Method according to claim 9 or 10, characterized in that the pilot signal subcarriers are selected by the base station such that they are directly adjacent.
12. Method according to one of claims 9 to 11, characterized in that the pilot signal is formed by at least two successive symbols and the successive symbols are transmitted by the pilot signal subcarriers.
13. Method according to claim 12, characterized in that during pilot signal transmission no further symbols are transmitted by further available subcarriers.
14. Method according to claim 12 or 13, characterized in that
  - a time deviation is determined based on a phase rotation established between received symbols of different pilot signal subcarriers and/or
  - a frequency deviation is determined based on a phase rotation established between successive symbols of a pilot signal subcarrier.
15. Method according to one of the preceding claims, characterized in that the data transmission is implemented by means of the TDD radio transmission standard or by means of the FDD radio transmission standard.

16. Base station, characterized by means for implementing the method according to one of claims 1 to 15.
17. Mobile station, characterized by means for implementing the method according to one of claims 2 to 15.
18. Radio communication system, characterized by at least one base station according to claim 16.
19. Radio communication system, characterized by at least one mobile station according to claim 17.